Seasonal Patterns of Wader Populations in Darwin, Northern Territory, 1974-1987

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Abstract

Counts of waders (Aves: Charadriformes) were made several times each month from 1974 to 1987, in the Darwin vicinity, Northern Territory. Four species, all breeding in Australia, were present year-round or were most numerous during the dry season months. Most species (at least 28) were wet season migrants, arriving and reaching maximum numbers in September or October. Approximately half of these species showed a second influx in numbers during December and January. Only a limited number of species showed a return passage through the study area. Seasonal patterns shown by the Darwin waders differ from those emerging from other parts of northern Australia (e.g. Lane 1987), indicating that distinct regional differences occur.

Introduction

Darwin, on the north coast of the Northern Territory, is one of the 20 most important sites for aggregations of waders (Aves: Charadriformes) within Australia (Lane 1987). It is the closest of these sites to south-east Asia and the Indonesian archipelago, and thus studies of waders near Darwin could play a prominent role in increasing our understanding of wader migration throughout this part of the world. Published records to date for this area are based upon limited sampling, such as reported in Lane (1987), or mostly unquantified observations, such as reported by Crawford (1972) for the period 1967-71.

Darwin has a marked wet-dry monsoonal climate, with rainfall between years being highly variable (Ridpath 1985). The wet season usually extends from December-March, the dry from June-September, with short intervening transition periods. The studies reported here commenced in 1974 and continued until mid-1987. They form part of more extensive records kept for all bird species in the area. Previous reports for the study area have been made for other groups of birds (McKean 1981, 1986; Thompson 1982, 1984).

Methods

Surveys were made several times each month, at each of six habitat types: beach and intertidal mudflat (Lee Point and Buffalo Creek), mangroves (Buffalo Creek,

Palmerston and Sanderson sewage ponds), sewage ponds (Sanderson, Palmerston), saltflats (Leanyer), estuarine swamp merging into freshwater swamp (Holmes Jungle Swamp), and open grassland (Holmes Jungle, Lee Point road). A total of 1,330 surveys were made. The maximum count for a species for any given month was used in the data analysis. This was used rather than all the individual counts per month, as variations across surveys were high due to differences in time and stage of tide, observers and length of time per survey. The time period spent on each survey was usually about 60 minutes, but varied between 30 and 180 minutes.

Because the data were not standardised, it is assumed that the numbers represent relative data only; therefore, non-parametric tests of statistical significance were applied. To test whether the population samples were significantly different from month to month, the data were analysed using the non-parametric Friedmann two-way analysis of variance. The monthly figures were ranked within a given year from lowest to highest. The test determines whether the rank totals for the months over the 14 years differ significantly.

PLATE 3 *Large Sand Plovers and Sanderlings, Darwin* (A. Hertog)

Results

Thirty-three wader species were recorded regularly during the study. There were also several records of vagrant species, but as these have been documented elsewhere (e.g. McKean *et al.* 1976; McKean & Hertog 1981), and do not show population trends, they are not dealt with in this paper. Twenty-six species occurred frequently enough to test for significant changes in population levels.

These fell into three groups based on patterns of abundance through the year: those which were present year-round without marked seasonal changes (one species), those which showed dry season peaks (three species), and the remainder which showed wet season peaks (22 species).

The only species that showed no significant seasonal changes in population was the Red-capped Plover *Charadrius ruficapillus*, although January showed consistently larger numbers (Fig. 1). The three species which were most numerous during the dry season months of June-September were the Australian-breeding Masked Lapwing *Vanellus miles*, Black-winged Stilt *Himantopus himantopus*, and Australian Pratincole *Stiltia isabella* (Fig. 1). The remaining species were long-distance migrants from the Palaearctic region which showed highest numbers during the wet season, or wet season transition months (October-November) (Fig. 2).

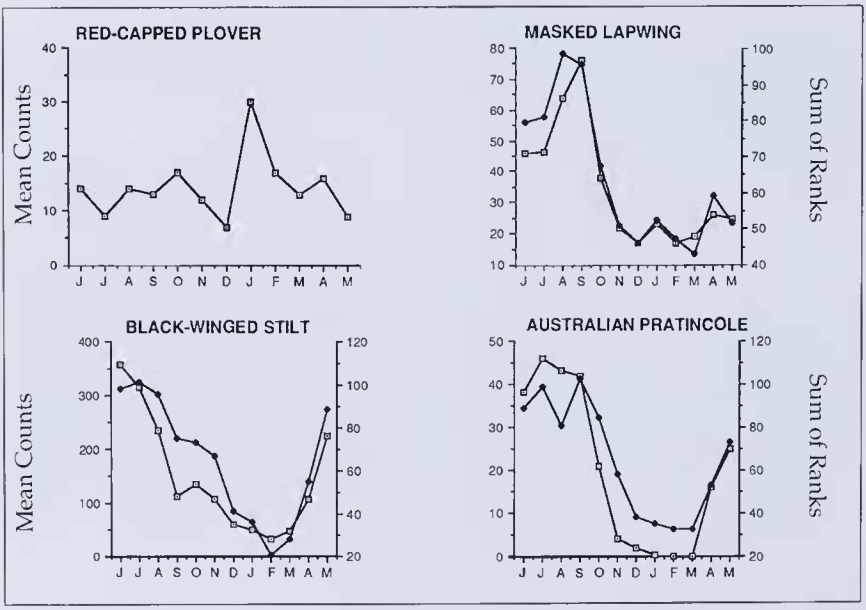

FIGURE 1. *Mean counts of individuals per month for four Australian-breeding species. Except for Red-capped Plover, graphs show both mean counts of individuals (-□-) and sum of monthly ranks (-●-) over the full study period, 1974-87.*

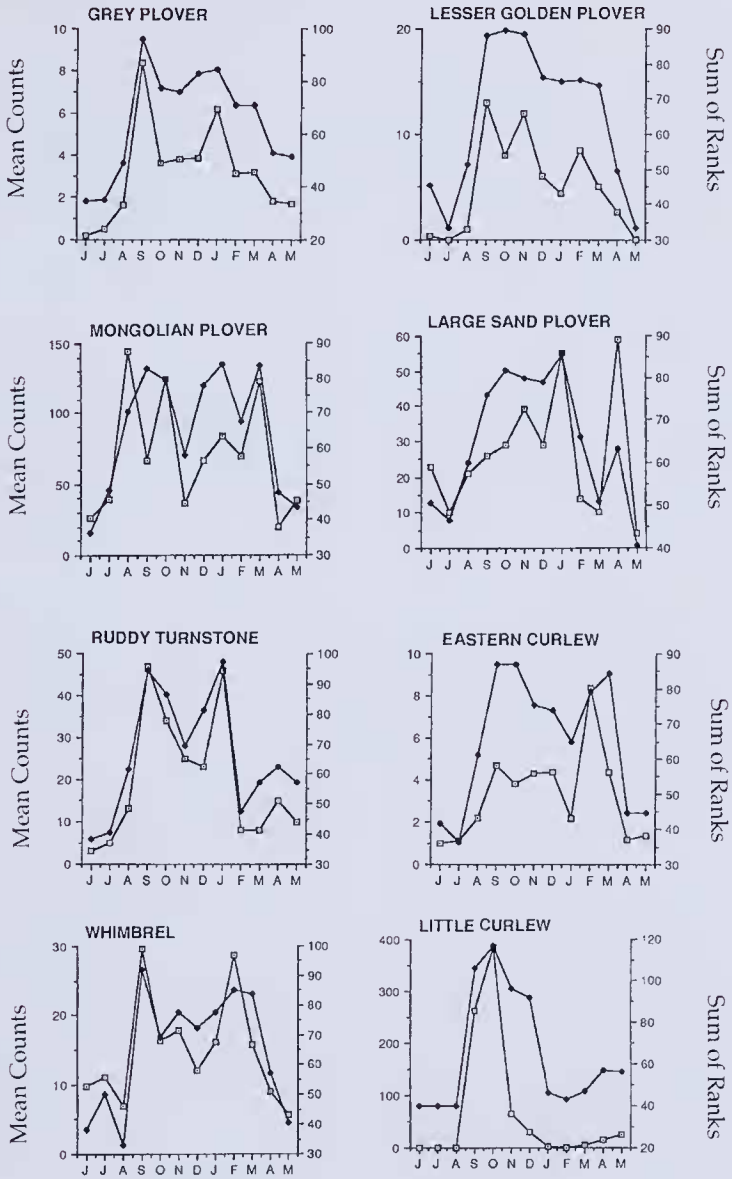

FIGURE 2 *Mean counts of individuals (-□-) and sum of monthly ranks (-●-) over the full study period, 1974-8 for wet season migrant waders.*

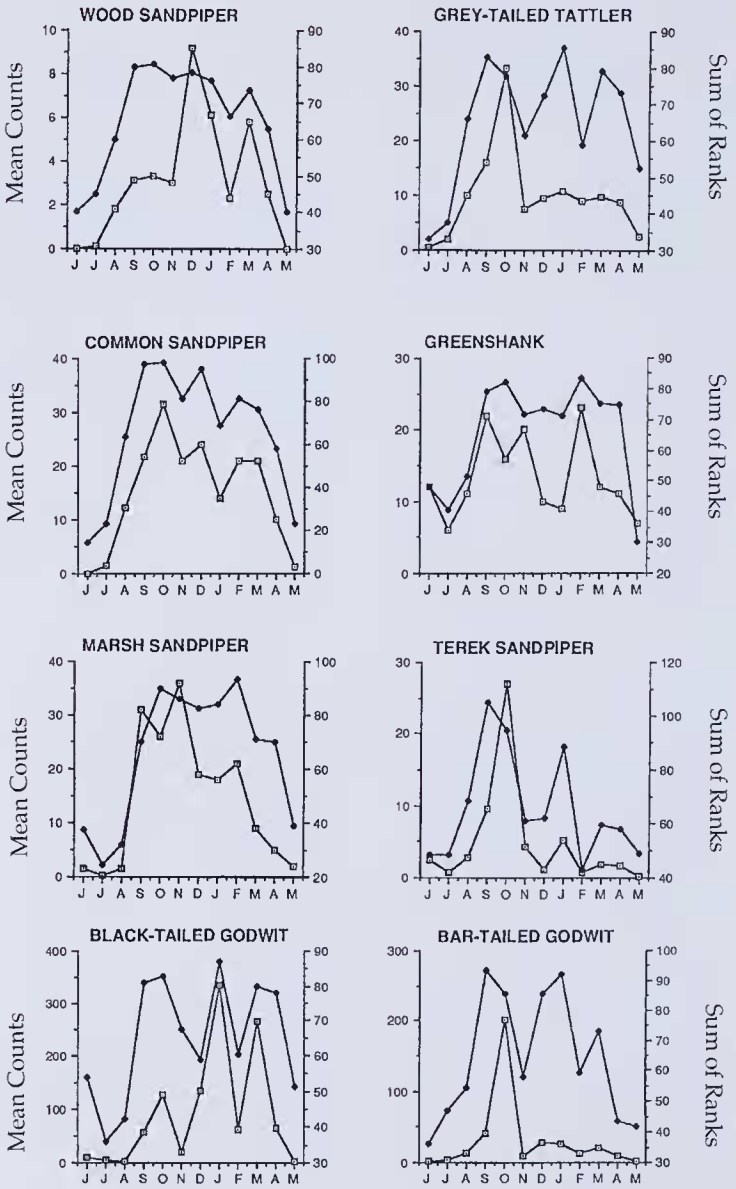

FIGURE 2 *(continued)*

Arrival of Long-distance Migrants

Long-distance migrant species generally arrived in Darwin during September, but maximum numbers were in either September or October, with the exception of Oriental Pratincole *Glareola maldivarum* (Fig. 2). Based on the measure of the total ranks, those species with initial peak numbers in September (Group 1) were Grey Plover *Pluvialis squatarola*, Mongolian Plover *Charadrius mongolus*, Ruddy Turnstone *Arenaria interpres*, Whimbrel *Numenius phaeopus*, Grey-tailed Tattler *Tringa brevipes*, Terek Sandpiper *T. terek*, Bar-tailed Godwit *Limosa lapponica*, Great Knot *Calidris tenuirostris*, Curlew Sandpiper *C. ferruginea* and Sanderling *C. alba*.

Other long-distance migrant species, although they commenced arriving in September or earlier, peaked later, in October (Group 2). These included Large Sand Plover *Charadrius leschenaultii*, Little Curlew *Numenius minutus*, Greenshank *Tringa nebularia*, Marsh Sandpiper *T. stagnatilis*, Black-tailed Godwit *Limosa limosa*, Sharp-tailed Sandpiper *Calidris acuminata* and Red-necked Stint *C. ruficollis*. Other species (Group 3) were not consistent in their arrival month, including Lesser Golden Plover *Pluvialis dominica*, Eastern Curlew *Numenius madagascariensis*, Wood Sandpiper *Tringa glareola* and Common Sandpiper *T. hypoleucos*.

December-January influx

About a half of the long-distance migrants showed a second influx during the months of December and January. After building up numbers during September and October, these species showed substantial decreases during November and early December, but subsequently increased again in late December and January. Their numbers characteristically declined again in February. This December-January influx was found in all the species of Group 1 (September maxima), as well as for the Large Sand Plover, Common Sandpiper, Black-tailed Godwit and Red-necked Stint. Two other species, the Greenshank and Marsh Sandpiper, showed a similar pattern, but with the increase in February.

Departure and return passage of long-distance migrants

Most long-distance migrants (16 species) departed during March and early April, though three species departed in late April-May. Only one species, the Large Sand Plover, showed strong evidence of a return passage through the study area (presumably from southern Australia), with substantial increases in the study area during February-April. Other species showing minor increases during this period include Mongolian Plover, Sanderling, Whimbrel, Eastern Curlew, Ruddy Turnstone and Greenshank.

Several long-distance migrants were present in limited numbers throughout the northern hemisphere breeding season, June-July. These were Great Knot, Greenshank, Whimbrel, Large Sand Plover, Mongolian Plover, Red-necked Stint and Eastern Curlew.

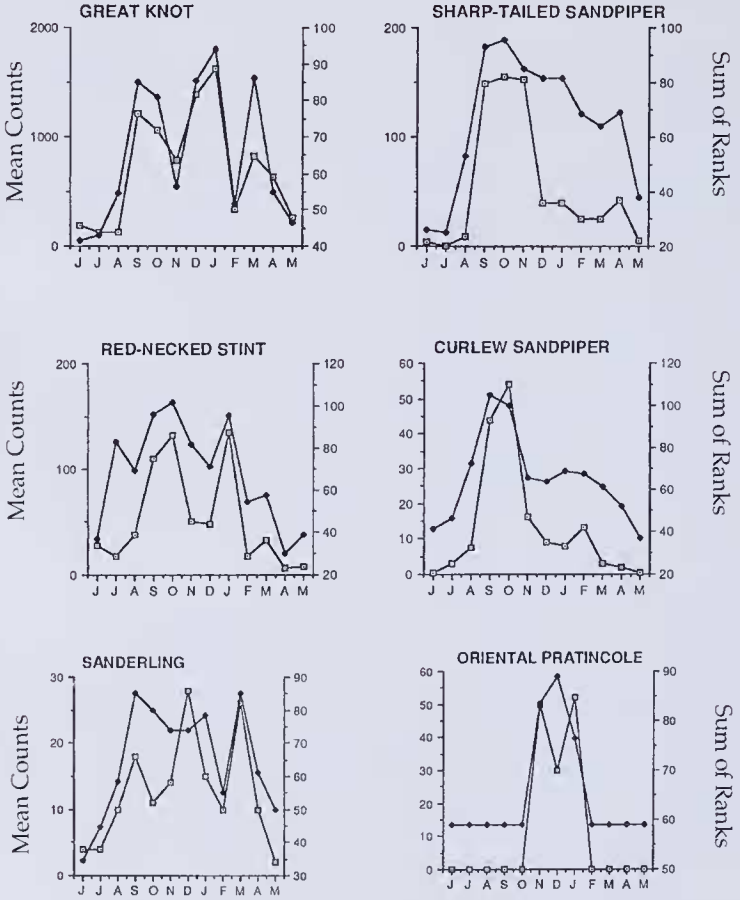

FIGURE 2 *(continued)*

Restricted Season Species

Little Curlew *Numenius minutus* and Oriental Pratincole showed discrete, restricted seasonal patterns, occurring only from September to January (Fig. 2). Oriental Plover *Charadrius veredus*, which occurred in very small numbers (see below), showed a similar trend. All three species feed on open grasslands but move out of the study area after the start of the wet season, when local feeding grounds become flooded and alternative areas become suitable due to widespread rains. Little Curlew disperse inland after the onset of rains flood their feeding grounds and do not show a return passage through the study area (McKean *et al.* 1986), probably due to lack of suitable feeding grounds at that time.

Uncommon Species

The remaining species occurred in numbers too low to show statistically significant population patterns. A few Beach Thick-knees *Burhinus neglectus* were regularly recorded, except from April to July. Pied Oystercatcher *Haematopus longirostris* and Sooty Oystercatcher *H. fuliginosus* were found in every month. Several other species that breed within Australia were absent during at least part of the wet season. Black-fronted Dotterel *Charadrius melanops* and Red-kneed Dotterel *Erythrogonys cinctus* were absent from November and December respectively, to February. Red-necked Avocet *Recurvirostra novaehollandiae* was never recorded from November to April. These absences could coincide with breeding elsewhere. Their abundance in the study area varied substantially from year to year.

Other uncommon species showed patterns similar to the more common wet season migrants. Swinhoe's Snipe *Gallinago megala* was present from October to April, while Little Ringed Plover *Charadrius dubius* occurred only from September to March. A few species apparently disappeared, and then reappeared later during the wet season. Oriental Plover was found from August to January, and subsequently in April, on return passage. Red Knot *Caladris canutus* was present in September-October, December-January, and March-May.

Discussion

Australian breeding species were the only ones which showed higher numbers during the dry season, possibly representing influxes of birds from further south, where conditions would be drier and colder. The large numbers of Red-capped Plover recorded during January in Darwin conflict with the data of Crawford, as reported in Lane (1987), which indicated that highest numbers occurred during the dry season on saline plains. This pattern clearly does not hold for the range of habitats surveyed in this study.

Most migrants arrived during the period August-October; 17 species being very consistent in their arrival month. Approximately 50% of maximum counts occurred during September, 30% in October and 20% in August, with one species (Oriental Pratincole) having maximum numbers in December. This timing appears to be slightly later than the maximum counts found for north-western Australia (see Lane 1987). It suggests that the migrants landing in the north-west may originate from separate places in Asia to those landing in Darwin; or that Darwin birds have moved east after first arriving in north-west Australia, as has been suggested by Lane.

This study found a second influx in numbers for several long-distance migrants during December and January. Two waves of migration had previously only been reported for Red-necked Stint (Lane 1987). The second influx could represent birds newly arriving from overseas (perhaps juveniles, M. Barter pers.comm.) or

ERRATA: *Northern Territory Naturalist* **14 (1993)**

1. *On p 7 and back cover:*

Assessment of Banteng Grazing on Coastal Plains, Cobourg Peninsula: an Update on Bowman (1994)
should read:
Assessment of Banteng Grazing on Coastal Plains, Cobourg Peninsula: an Update on Bowman (1993)

2. *On pp 7, 8, 9*

Bowman (1994) *should read:* Bowman (1993)

3. *On p 9 in References*

Bowman, D.J.M.S. (1994) Effect of large herbivore exclusion on understorey biomass in three plant communities.....
should read:
Bowman, D.J.M.S. (1993) Effect of large herbivore exclusion on understorey biomass in three plant communities.....

4. *On back cover (contents)*

Seasonal patterns of wader populations in Darwin, Northern Territory, 1974-1987. K.S. SHURCLIFF and H.A.F. THOMPSON
should read: K.S. SHURCLIFF